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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,438	06/05/2006	Mike Kunze	12939/003	5578
27879 7590 03/19/2008 INDIANAPOLIS OFFICE: 27879 BRINKS HOFER GILSON & LIONE ONE INDIANA SQUARE, SUITE 1600 INDIANAPOLIS, IN 46204-2033				
EXAMINER				
LOUIE, WAI SING				
ART UNIT		PAPER NUMBER		
2814				
NOTIFICATION DATE		DELIVERY MODE		
03/19/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentofficeactions@brinkshofer.com

svessely@usebrinks.com

dhasler@usebrinks.com

Office Action Summary

Application No.

10/549,438

Applicant(s)

KUNZE ET AL.

Examiner

Wai-Sing Louie

Art Unit

2814

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33, 38, 41, 44 and 46-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33, 41, 44 and 46-49 is/are rejected.
- 7) ☒ Claim(s) 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 5/4/07
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-33, 38, 41, 44, and 46-49, in the reply filed on 12/19/07, is acknowledged. The restriction is final. It is suggested that non-elected claims be canceled in the response to this Office Action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 30-32, and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Bridger et al. (US Pub. 2002/0067992).

With regard to claims 1, 30-32, and 48, Bridger et al. disclose a MEMS device (¶ [0028] et seq. and fig. 1) having:

- A substrate 16 (¶ [0034] and fig. 1);
- A homogeneous semiconductor layer 12, Which is disposed on the substrate 16 and contains p-GaN (¶ [0034] and fig. 1), the surface of the homogeneous semiconductor layer 12 oriented towards the substrate 16 (fig. 4c) having a

spacing from the surface of the substrate 16 orientated towards the homogeneous semiconductor layer 12 (fig. 4e);

- At least two electrical conducting contacts 18a and 18b, where the homogeneous semiconductor layer 12 having a change in a physical variable means (fig. 2 and fig. 4e). The homogeneous semiconductor layer uses as a semiconductor sensor element and generated an electrical output signal are the usage of the product. A product and the usage of the product are distinct inventions see MPEP § 806.05(h), where the usage of the product does not carry any patentable weight in a product prosecution.

With regard to claim 2, Bridger et al. disclose the contacts is disposed in a region of the homogeneous semiconductor layer 12, where has no spacing from the substrate 16 (fig. 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-7, 16, 33, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridger et al. (US Pub. 2002/0067992).

With regard to claim 3, Bridger et al. disclose a mesa region 14, which is perpendicular to the surface of the substrate 16 and orientated toward the homogeneous semiconductor layer 12 (¶

Art Unit: 2814

[0014] and fig. 1). Bridger et al. do not disclose the mesa region 14 has a greater thickness than the homogeneous semiconductor layer 12. However, it would have been obvious to one of ordinary skill in the art to use any suitable thicknesses for the device, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

With regard to claims 4 and 33, Bridger et al. disclose the mesa region (anchor point) 14 is disposed such that it extends in a direction parallel to the surface of the substrate 16 orientated toward the homogeneous semiconductor layer 12 (fig. 1).

With regard to claim 5, Bridger et al. disclose the transition from the spaced region 20 to the mesa region 14 is effected in the direction parallel to the surface of the substrate 16 orientated towards the homogeneous semiconductor layer 12 in the region of the center of the raised region (fig. 1).

With regard to claims 6 and 44, Bridger et al. disclose the two electrical contacts 18a and 18b are disposed on the homogeneous semiconductor layer 12 at the outer edge of the mesa region 14 (fig. 1).

With regard to claims 7 and 16, Bridger et al. disclose the homogeneous semiconductor layer 12 has a thickness of 1 μm thick (§ [0036]) and the mesa region 14 has a thickness 1 μm thick (§ [0035]).

Claims 8-15, 17-29, 41, 46-47, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridger et al. (US Pub. 2002/0067992) in view of Ueda (US Pub. 2003/0089906).

With regard to claims 8 and 47, Bridger et al. disclose the substrate 16 is made of sapphire, but do not disclose the substrate 16 is made of silicon. However, Group III-V epitaxially grown layer on a silicon substrate is commonly done in the art. Ueda discloses forming an GaN layer 3 in a <11-20> direction on a <110> direction of a silicon substrate 4 (Ueda ¶ [0074]). Ueda teaches the formation of these layers in parallel relation is for easy cleavage of the device (Ueda ¶ [0009]) and silicon substrate is superior heat dissipation (Ueda ¶ [0010]). Therefore, it would have been obvious to one of ordinary skill in the art to modify Bridger's device with the teaching of Ueda to provide a silicon substrate for the device in order to cleave the device easily and for heat dissipation.

With regard to claims 9-10 and 17, Bridger et al. modified by Ueda disclose a Group III nitride in form of GaN, AlGaN, and InGaN (Ueda ¶ [0076]).

With regard to claim 11, Bridger et al. disclose the homogeneous semiconductor layer 12 is partially cantilevered (¶ [0038]) and fig. 1).

With regard to claims 12-14, Bridger et al. disclose the micro-channel 20 is filled at least partially with non-metallic and non-semiconducting material (¶ [0013]).

With regard to claim 15, Bridger et al. disclose the homogeneous semiconductor layer 12 is p-GaN (¶ [0009]).

With regard to claims 18-21, Bridger et al. modified by Ueda disclose an p-AlGaN cover layer 3d with a thickness of 300 nm (Ueda ¶ [0076] and fig. 1d).

With regard to claims 22-23, Bridger et al. modified by Ueda disclose an undoped InGaN layer 3c on the cover layer 3d, which is further away from the silicon substrate 4 (Ueda ¶ [0076] and fig. 3).

With regard to claim 24, Bridger et al. disclose the homogeneous semiconductor layer 12 is doped with Mg having a carrier concentration in the range of $10^{18}/\text{cm}^3$ (¶ [0036]).

With regard to claim 25, Bridger et al. disclose the electrical contact 18a is p-contact (fig. 1).

With regard to claim 26, Bridger et al. modified by Ueda disclose the n-contact contains Al/Ti (Ueda ¶ [0077]).

With regard to claim 27, Bridger et al. disclose the p-contact contains Au/Ni (¶ [0032]).

With regard to claim 28, Bridger et al. modified by Ueda do not disclose the electrical contacts are disposed in between the cover layer and the homogeneous semiconductor layer. However, the specification contains no disclosure of either the critical nature of the claimed process/arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

With regard to claim 29, Bridger et al. disclose the electrical contact 18a is made of metal (¶ [0032]).

With regard to claim 41, Bridger et al. disclose the maximum vertical deflection of 9.2 μm (¶ [0038]) and the spacing of anchor points is 200 μm (¶ [0040]), but do not disclose the vertical deflection is 20 to 200 μm and spacing of anchor point is 300-500 μm . However, it

Art Unit: 2814

would have been obvious to one of ordinary skill in the art to use any suitable height and spacing for the device, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

With regard to claim 46, Bridger et al. disclose the deflectable homogeneous semiconductor layer 12 is a solid body can be deflected directly relative to the substrate 16 and the mesa region 14 is not deflectable (fig. 1).

With regard to claim 49, Bridger et al. modified by Ueda disclose a Schottky contact (Ueda ¶ [0078]).

Allowable Subject Matter

Claims 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose or suggest either in singularly or in combination the following limitations and other elements in the claims:

References Bridger et al. and Ueda do not disclose:

- The deflectable part of the homogeneous semiconductor layer is a Y-shaped bar and is connected to the substrate via three anchor points.

Therefore, the above references do not disclose the claimed invention of present application and claims 38 is allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is 571-272-1709. The examiner can normally be reached on 7:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wai-Sing Louie/
Primary Examiner, Art Unit 2814

Wsl
March 7, 2008.